

Title: Smile and Tile in Style!

Brief Overview:

The student will find the area of his/her individual bedroom floor (den or other room of choice). The student will make a scale model of the room to be used in the planning of the tile floor using a tessellating pattern.

Link to Standards:

- **Problem Solving** Students will demonstrate their ability to solve mathematical problems with respect to individual problems.
- **Communication** Students will demonstrate their ability to communicate mathematically by reading, writing, and discussing mathematics with signs, symbols, and terms of the discipline.
- **Reasoning** Students will reason geometrically after gathering and analyzing information.
- **Connections** Students will demonstrate their ability to connect geometric concepts to the real-world.
- **Number Relationships** Students will use their understanding of numerical operations to solve algorithms needed for steps in the problem solving process.
- **Number Systems** Students will utilize knowledge of fractions and mixed numbers to collect measurements for problem solving.
- **Computation & Estimation** Students will utilize computation skills in measurement and solving.
- **Statistics** Students will collect and organize data as a step in problem solving.
- **Geometry** Students will recognize and appreciate geometry in their everyday lives and world. They will demonstrate and apply similarity and symmetry to the solution of their geometric problems.
- **Patterns & Relationships** Students will plan and create their own geometric design (tessellation) for problem solving.

- **Measurement** Students will apply concepts of measurement using customary units to verify measurements for a real-world situation.

Grade/Level:

Grade 6

Duration/Length:

This activity will take 6 days, with students working approximately 45 minutes per day.

Prerequisite Knowledge:

- Students should be able to find the area of a given shape.
- Students should be able to use customary units of measurements.
- Students should understand basic operations of mixed numbers and fractions.
- Students should have been exposed to scale drawings.

Objectives:

Students will:

- Find the area of the floor in his/her room by specific dimensions.
- Determine appropriate scale and construct a scale model of the floor model.
- Select tessellation pattern to cover the floor and determine the amount of tiles needed to solve the problem.
- Complete model of tile floor (minimum of two colors).

Materials/Resources/Printed Materials:

Materials for teacher:

- Models to show scale (model car, train, blueprints/your school if possible, globe)
- *Introduction To Tessellations* by Dale Seymour and Jill Britton
- *Tessellation Teaching Masters* by Dale Seymour
- Transparencies of (2) tessellation patterns of choice
- Overhead pattern blocks
- Transparent geoboard
- Advertisements/pictures of patterned floors
- Floor samples (optional/discards/discontinued business samples)
- Transparency of Resource Sheet #1

Materials for students:

- Geoboards and bands
- Yardsticks
- Grid paper
- Pattern blocks
- Journals
- Compasses

Development/Procedures:

Day 1:

- Teacher introduces unit by showing vinyl floor samples or advertisements and discussing our likes and dislikes. Bring into the discussion that we will use what we know about finding the area of a surface to create one of these or our own floor pattern.
- Hand out geoboards and rubber bands.
- Teacher sets up 3-4 problem situations for finding the area of a rectangle, triangle, trapezoid on the overhead geoboard.
- Allow students to work together if needed as a review.
- Students generate other polygons on their geoboards to solve. Teacher moves around the room to determine mastery. Have a student(s) summarize verbally how to find the area of a figure.
- Divide students into groups of two, giving each group a yardstick (meter stick if you desire to use the metric system).
- Have students find the area of their classroom. Measurements will involve mixed numbers and conversions.
- Teacher records group data on overhead or board. Together determine the exact area of the classroom for closure.
- HOMEWORK - What is the area of your bedroom floor?

Days 2 & 3:

- Introduce today's session by connecting yesterday's tasks with making scale drawings.
- Use transparency of Resource Sheet #1 to show a scale drawing and explain that a scale is the same shape, but not the same size as the actual object. Explain that this scale is 1 in. : 6 ft. or 1" represents 6'. Spend as much time as needed on Resource Sheet #1 for you and your students to feel comfortable (this may take 1-3 sessions).
- Have students draw their desktop. Trace on large paper, if needed. Find the area. Use the scale 1 in. : 1 ft. to make a scale drawing of your desktop.
- Using the exact area of the classroom (from yesterday's lesson), decide together on scale factor.
- Construct scale drawings of their classroom.
- HOMEWORK: Construct a scale drawing of your bedroom.

Day 4:

- Have tessellation transparency on overhead. As soon as students arrive have them look for patterns. Encourage language and complete sentences.
- Distribute pattern blocks. Allow time for “fire explore.”
- Ask students to make their own designs and patterns.
- After everyone is successful, brainstorm for properties leading to an understanding of a tessellation (concretely and verbally).
- Each student will select or create a tessellating pattern of his/her choice for a model of his/her room. Encourage the use of two different color tiles.
- In closing, share students’ scale drawings. (Teacher determines reasonableness of scale models; models should cover most of 8 ½” x 11” paper in order to see repeating pattern.)

Day 5:

- Hand out to each student the scale model of his/her bedroom that has been reviewed prior to this session, grid paper, and pattern blocks.
- Each student should transfer the scale model to his/her grid paper.
- Student will cover the model with tessellating pattern of choice.
- Student may trace or use compasses to draw the pattern on the model grid paper. Color when completed.

Day 6:

- Any student who has not completed work may do so. Students who may work more quickly should have been encouraged to challenge themselves with more complex patterns (i.e. multiple polygonal shapes).
- With 20-30 minutes left in the session, discuss the products. What did I learn? Is there any aspect of our finished product I felt I could improve upon the next time? What was especially difficult for me? Did I benefit from support of other peers?
- Students will write in their journals explaining what they learned and their feelings concerning the tasks and their finished product.

Evaluation:

Teachers will evaluate students based on the following criteria:

- Daily participation
- Student reflection in journal
- Finished product evaluated by Tile in Style Rubric

Extension/Follow Up:

Students’ completed products will be laminated. They will organize them into a classroom bulletin board.

Authors:

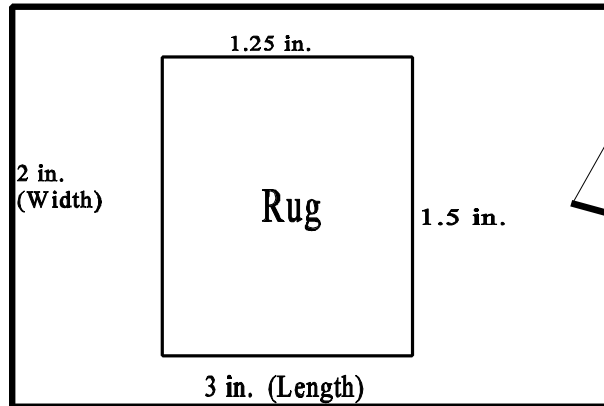
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Resource Sheet #1

Scale Drawings

(Scale : 1 in. : 6 ft.)



NOTE: Your students may be able to solve these types of problems by using a proportion.

STEP 1: Write a proportion.

Length in drawing (in.) $1/6 = 3/n$
Actual length (ft.)

STEP 2: Solve using cross products.

$$\begin{aligned} 1/6 &= 3/n \\ 1 \times n &= 3 \times 6 \\ n &= 18 \end{aligned}$$

Resource Sheet #2

Grid Paper

[illegible]

Resource Sheet #3

TILE IN STYLE RUBRIC

Exceptional

- Area of room is reasonable.
- Model is scaled accurately.
- Tessellating pattern is definite and consistent.
- Minimum of two different colors used.

Good

- Area of room is reasonable.
- Model is within 1/4" of accuracy.
- Tessellating pattern can be seen.
- Minimum of two different colors used.

Medium

- Area of room is reasonable.
- Model is 1/2" or more inaccurate.
- Tessellating pattern may be seen.
- Only one color used.

Low

- Area or room unreasonable.
- Model is inaccurate.
- Tessellating pattern.
- Only one color used.